UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,489	03/15/2006	Hideki Miyazaki	14434.92USWO	6312

52835 7590 03/20/2008

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.
P.O. BOX 2902
MINNEAPOLIS, MN 55402-0902

EXAMINER	
LAVARIAS, ARNEL C	

ART UNIT	PAPER NUMBER
2872	

MAIL DATE	DELIVERY MODE
03/20/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/561,489	MIYAZAKI ET AL.	
	Examiner	Art Unit	
	Arnel C. Lavarias	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *3/15/06,12/20/05*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 December 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/15/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendments to Claim 14 in the preliminary amendment filed 12/20/05 are acknowledged and accepted.

2. The addition of Claim 15 in the preliminary amendment filed 12/20/05 is acknowledged and accepted.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

4. The originally filed drawings were received on 12/20/05. These drawings are objected to for the following reason(s) as set forth below.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Figure 1B- Reference numeral 30.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures

appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. *It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.*

7. The abstract of the disclosure is objected to because of the following informalities:

Abstract, line 2- 'The present invention proposes a' should read 'A'

Abstract, line 3- 'In the invention, light' should read 'Light'

Abstract, line 8- 'According to the invention, it' should read 'It'.

Correction is required. See MPEP § 608.01(b).

8. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in

correcting any errors of which applicant may become aware in the specification. Examples of such errors are set forth below.

9. The disclosure is objected to because of the following informalities:

Paragraph 0063, line 9- 'cameral' should read 'camera'

Paragraph 0074, line 2- 'show' should read 'shown'.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

11. Claims 1-15 are rejected under 35 U.S.C. 102(a) as being anticipated by Miyazaki et al. (H. T. Miyazaki, H. Miyazaki, Y. Jimba, Y. Kurokawa, N. Shinya, K. Miyano, 'Light diffraction from a bilayer lattice of microspheres enhanced by specular resonance', J. Appl. Phys., vol. 95, no. 3, February 1, 2004, pp. 793-805.).

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Miyazaki et al. discloses a light diffraction method (See for example Figures 1, 9, 14) using a diffraction grating, wherein the diffraction grating comprises a first layer containing two or more first light scatterers, two or more of which being periodically

arrayed along a first direction and either a) two or more of which being arrayed along a second direction or b) extending along the second direction; and a second layer containing two or more second light scatterers respectively corresponding to the two or more first light scatterers, the two or more second light scatterers being disposed at positions shifted from the two or more first light scatterers by a predetermined distance along a predetermined direction in a plane that is other than a plane containing the first direction and the second direction; the method (See in particular Figure 14) comprising making light incident on the diffraction grating so that in a case of a), the light is incident along a plane containing two or more trajectories selected from trajectories formed by the shifting of the two or more first light scatterers in the predetermined direction; and in both cases of a) and b), specular resonance occurs (See Abstract) in two or more light scattering units, each comprising one light scatterer selected from the two or more first light scatterers and one of the second light scatterers corresponding to the selected one of the first light scatterers, whereby a fraction of diffracted light that is diffracted by the first layer and the second layer is enhanced selectively by the specular resonance in the two or more light scattering units. Miyazaki et al. additionally discloses changing at least one selected from a relative positional relationship between the first layer and the second layer, and an incident angle of light on the diffraction grating, to change diffracted light that is to be enhanced selectively (See for example Figures 14c, d, e); diffracted light with a single order is enhanced selectively (See for example Section VC); diffracted light in a predetermined wavelength range is enhanced selectively (See for example Section VC).

Miyazaki et al. additionally discloses a light diffraction device (See for example Figures 1, 9, 14) comprising a diffraction grating and a light projecting device (See for example Figure 2), the diffraction grating comprising a first layer containing two or more first light scatterers, two or more of which being periodically arrayed along a first direction and either a) two or more of which being arrayed along a second direction or b) extending along the second direction; and a second layer containing two or more second light scatterers respectively corresponding to the two or more first light scatterers, the two or more second light scatterers being disposed at positions shifted from the two or more first light scatterers by a predetermined distance along a predetermined direction in a plane that is other than a plane containing the first direction and the second direction; the light projecting device being for making light incident on the diffraction grating so that in a case of a), the light is incident along a plane containing two or more trajectories selected from trajectories formed by the shifting of the two or more first light scatterers in the predetermined direction; and in both cases of a) and b), specular resonance occurs (See for example Abstract) in two or more light scattering units, each comprising one light scatterer selected from the two or more first light scatterers and one of the second light scatterers corresponding to the selected one of the first light scatterers, whereby a fraction of diffracted light that is diffracted by the first layer and the second layer is selectively enhanced by the specular resonance in the two or more light scattering units. Miyazaki et al. further discloses driving device for changing at least one selected from a relative positional relationship between the first layer and the second layer, and an incident angle of light on the diffraction grating (See for example Figure 14d, e); at least

one light detection device for detecting diffracted light that has been enhanced selectively (See for example Figure 2); and a position encoding device, comprising a light diffraction device according to claim 7, a first member, and a second member, wherein the first member and the second member are connected to the first layer and the second layer, respectively, and the at least one light detection device detects the intensity of diffracted light that changes according to relative positions of the first layer and the second layer, to detect the relative positional relationship between the first member and the second member (See for example Figure 2).

Miyazaki et al. further discloses a diffraction grating (See for example Figures 1, 9, 14) comprising a first layer containing two or more first light scatterers, two or more of which being periodically arrayed along a first direction and either two or more of which being arrayed along a second direction or extend along the second direction; and a second layer containing two or more second light scatterers respectively corresponding to the two or more first light scatterers, the two or more second light scatterers being disposed at positions shifted from the two or more first light scatterers by a predetermined distance along a predetermined direction in a plane that is other than a plane containing the first direction and the second direction; wherein the diffraction grating has two or more light scattering units, in each of which one light scatterer selected from the two or more first light scatterers and one of the second light scatters corresponding to the selected one of the first light scatters are disposed adjacent to each other so that incident light can cause specular resonance (See for example Abstract); and the two or more first light scatterers and the two or more second light scatterers respectively in the first layer and the second

layer are disposed spaced apart from each other (See for example Figures 14c, d, e). Miyazaki et al. further discloses a first substrate for retaining the two or more first light scatterers, a second substrate for retaining the two or more second light scatterers, and a gap-retaining member for retaining the first substrate and the second substrate so as to be spaced apart from each other (See for example Figure 14c, d, e); a driving device for changing the relative positional relationship between the first layer and the second layer (See for example Figure 14d, e); and an optical component integrated with the diffraction grating (See for example Figure 14f).

Miyazaki et al. finally discloses a diffraction grating (See for example Figures 1, 9, 14) comprising a first layer containing two or more first light scatterers, two or more of which being periodically arrayed along a first direction and either two or more of which being arrayed along a second direction or extend along the second direction; and a second layer containing two or more second light scatterers respectively corresponding to the two or more first light scatterers, the two or more second light scatterers being disposed at positions shifted from the two or more first light scatterers by a predetermined distance along a predetermined direction in a plane that is other than a plane containing the first direction and the second direction; wherein the diffraction grating has two or more light scattering units, in each of which one light scatterer selected from the two or more first light scatterers and one of the second light scatters corresponding to the selected one of the first light scatters are disposed adjacent to each other so that incident light can cause specular resonance (See for example Abstract); the two or more first light scatterers and the two or more second light scatterers are disposed so as to be in contact with each other

(See for example Figure 14b); and at least one selected from the two or more first light scatterers and the two or more second light scatterers has a shape other than a sphere, or both the two or more first light scatterers and the two or more second light scatterers are spheres but are disposed so as to form a structure other than a close-packed structure (See for example Figure 14a, which discloses both 'Triangular' and 'Square' packing configurations). Miyazaki et al. further discloses the two or more first light scatterers and the two or more second light scatterers are columnar structures extending along the second direction (See for example Figure 14; Section VC); and an optical component integrated with the diffraction grating (See for example Figure 14f).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 10:00 AM - 6:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Arnel C. Lavarias
Primary Examiner
Group Art Unit 2872
3/14/08

/Arnel C. Lavarias/
Primary Examiner, Art Unit 2872